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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,439	03/24/2004	Andrej S. Mitrovic	071469-0307905	4269

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EXAMINER

KACKAR, RAM N

ART UNIT PAPER NUMBER

1763

DATE MAILED: 07/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/807,439

Applicant(s)

MITROVIC, ANDREJ S.

Examiner

Ram N. Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 1-13, 24-30 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-18, 21-23 and 31 is/are rejected.
- 7) ☒ Claim(s) 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/5/04</u> <u>3/24/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 14-23 and 31 in the reply filed on 5/4/2006 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claim 14 is rejected under 35 U.S.C. 102(b) as being anticipated by Natsuya Ishikawa (JP 02228546).**

Natsuya Ishikawa discloses a method of monitoring wafer temperature by measuring a resistance (impedance) of a load formed on one side of a substrate (Abstract).

4. **Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Mountsier et al. (US 5810933).**

Mountsier et al disclose an electrostatic chuck (Fig 1 and Col 1 lines 39-54) and disclose temperature control by contact with a cold body and controlling pressure of heat transfer gas between the substrate and the chuck to control its heat transfer coefficient (Col 1 line 41 and Col 8 lines 40-49). Mountsier et al show correlation of heat transfer coefficient with pressure (Fig 9 and Col 7 line 48).

Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Tamura et al. (US 5556204).

Tamura et al disclose an electrostatic chuck (Fig 1, Fig 2 and Col 2 lines 32-36) and disclose detection and control of temperature by controlling pressure of heat transfer gas between the substrate and the chuck (Fig 1, Fig 2 and Col 7 line 57-65 and Col 8 lines 60-67) to control heat transfer coefficient to a cold body (Fig 1-10). Fig 4 shows correlation of heat transfer coefficient with pressure of heat transfer gas.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arthur M. Howald (US Pub 2003/0038114).**

Arthur M. Howald discloses an electrostatic chuck and control of temperature by controlling heat transfer coefficient to a cold body (Paragraph 5). Further Howald teaches strong correlation between electrical properties (current, resistance and impedance) of the chuck and temperature (Fig 4 and Paragraphs 6, 23, 26, 31, 36, 42, 48, 49, 61, 63). Fig 4 demonstrates that resistance (impedance) at higher temperature is lower. Further (paragraph 88) teaches a way to measure resistance by measuring current and voltage.

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7. Claims 14, 16-18 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al (US Pub 2002/0086546) in view of Mountsier et al (US 5810933).

Yamashita et al discloses an electrostatic chuck and control of temperature by using heat transfer gas (Fig 1-9). Further Yamashita et al teach strong correlation between capacitance and plasma impedance and length of the gap between the substrate and the electrode (Paragraph 45). Further the gap length is affected by the pressure of heat transfer gas (Paragraph 69 and 76). Therefore the impedance is highly correlated with gap length and heat transfer gas pressure.

Mountsier et al disclose an electrostatic chuck (Fig 1 and Col 1 lines 39-54) and disclose temperature control by contact with a cold body and controlling pressure of heat transfer gas between the substrate and the chuck to control its heat transfer coefficient (Col 1 line 41 and Col 8 lines 40-49). Mountsier et al show correlation of heat transfer coefficient and therefore substrate temperature with pressure (Fig 9 and Col 7 line 48).

Therefore one of ordinary skill in the art at the time of invention would have found strong correlation between the substrate temperature and impedance on account of pressure and gap length.

Regarding claim 17 and 18 as taught by Mountsier et al and Yamashita et al the correlation between pressure and gap is well known. Further the effect of clamping voltage is to decrease gap and increase heat transfer coefficient at a pressure higher than free molecular regime (viscous) (Mountsier et al Fig 9). Therefore either of the two could be used for controlling heat transfer coefficient and temperature.

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Regarding claims 22 and 23 actual voltages and pressure are result effective parameters and there optimization for a certain substrate temperature would have been obvious.

Allowable Subject Matter

Claims 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 19 and 20 are allowable since the prior art does not fairly disclose or suggest impedance measurement at multiple frequencies and selection of parameters for most optimum correlation in order to measure temperature indirectly.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ram Kackar

Primary Examiner AU 1763